Process for the treatment of fruit juices, musts or the like, and means for carrying the same into effect

Publication number: GB468770
Publication date: 1937-07-05
Inventor:
Applicant: DONATIEN CHARLES MOULTON
Classification:
- international: ***A23L2/02; A23L2/70;*** **A23L2/02; A23L2/70;**
- european: A23L2/70
Application number: GB19350027408 19351004
Priority number(s): FRX468770 19350309

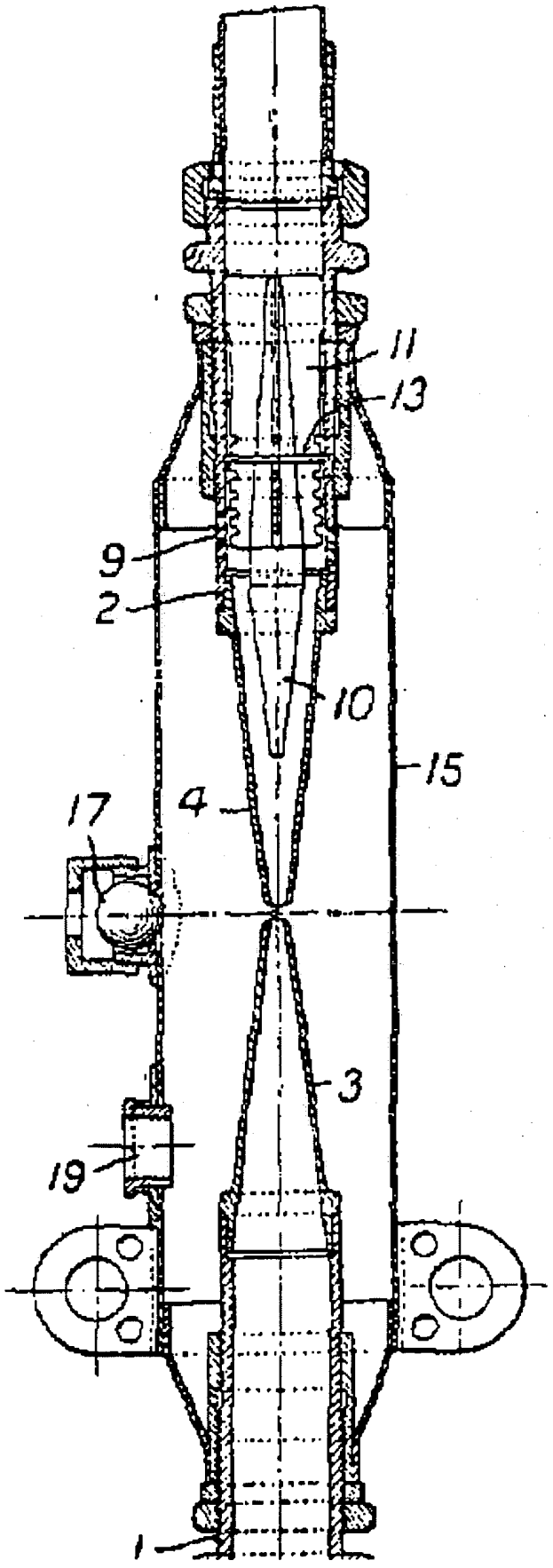
* p.2 addition of tannin
p.1 O2
p1 vat

Abstract of **GB468770**

468,770. Aerating liquids. MOULTON, D. C. Oct. 4, 1935, No. 27408. Void. Convention date, March 9. [Class 14 (i)] Fruit juices, wine, musts, alcoholic products, and the like are mixed intimately with air, carbon-dioxide, or other gas by means of an injector apparatus comprising inlet and outlet pipes 1, 2 with opposed nozzles 3, 4 through which the liquid is forced by a pump, gravity, &c. The nozzles, which are adjustable and interchangeable on the pipes, are enclosed in a casing 15 which has a port 19, connected to the atmosphere or to a source of gas under pressure, and a pressure-relief valve 17. A cone 10 is mounted adjustably in the nozzle 2 by means of grooved vanes 11 and a ring 13, and apertures 9 allow any liquid collecting in the casing 15 to be drawn into the pipe 2. The apparatus may be mounted between two centrifugal pumps driven by an electric motor and withdrawing the liquid from one tank and forcing it to another. The gas used preferably is cooled and, in the case of air, filtered. The aeration may be applied to new wine, cider, &c., the aerated product being allowed to stand for several days, during which mucilagenous substances, proteins, and salts are oxidized and precipitated. It may be applied at any stage of fermentation to accelerate the action and facilitate the elimination of sugar; for example, it may be carried out after the addition of tannin or to eliminate odours after fermentation or transport. Wines may be aerated during ageing. Old wines may be treated with carbon-dioxide, or fresh juice may be treated with sulphur dioxide to prevent fermentation.

- cordial p1
- O2 p.1
- may be carried out after the addition of tannin
- during ageing

FIG. 1.



PATENT SPECIFICATION

Convention Date (France): March 9, 1935. **468,770**

Application Date (in United Kingdom): Oct. 4, 1935. No. 27408/35.

Specification not Accepted

COMPLETE SPECIFICATION

Process for the Treatment of Fruit Juices, Musts or the like, and means for carrying the same into effect

I, DONATIEN CHARLES MOULTON, a British subject, of 53, Rue Edith Cavell, Courbevoie (Seine), France, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

My invention relates to the treatment of fruit juices or analogous liquids, the term fruit juice being herein employed in its most extended application, and comprising the juice of grapes, fermented or not (wine, cordial, vinegar), cider, beer, musts such as beet musts or the like, and all substances which are derived from the above-mentioned products or from which these products themselves are obtained.

My invention is chiefly applicable to the treatment of juices adapted for use as beverages, and its essential object is to facilitate, to effect or even to prevent a definite transformation of the product under the influence of yeasts or like substances which it may contain.

In the following considerations, reference will be chiefly made to this application in order to facilitate the description, but it is understood that my invention is by no means limited to this field.

In conformity to my invention, I add to the juice (wine, cider, beer, must) a gas in pure or diluted form, in such manner as to produce an emulsion, and the said juice is then allowed to stand, in a vat or like recipient.

According to another feature of the process, I employ oxygen for the emulsion, this gas being preferably in the diluted state as found in the atmosphere, it being preferably in the cold state or purposely cooled.

It has never proposed, as far as I am aware, to place the juice of fruits (wine or must) in contact with air in order to "emulsify" it, i.e. to produce an intimate mixture with the air in the form of bubbles of the whole amount of juice contained in the vat, which air will then leave the juice spontaneously when this latter is allowed to stand in the vat after all the particles of the juice have been stirred up and placed in contact with the emulsifying air.

The said treatment, which is quite simple and inexpensive, can be applied at any time to a new wine, cider, alcoholic product or the like, and it provides for the elimination, by oxygenation, of all substances which would subsequently produce a deposit. The efficacious action of the oxygen due to the emulsion will in fact render insoluble all the mucilagenous substances, the natural proteins, etc. . . as well the iron salts, and will precipitate the bitartrates and like substances. The air is preferably employed in a very cold state, thus using the external air in winter or air which is cooled in any suitable manner. The wine or other emulsified juice is then allowed to stand in a vat for several days, and thus the undesirable substances will be deposited and can be removed by means of a solution of glue, whose action will have indeed been facilitated by the emulsion or by any other means. The wine, must or the like will thus be perfectly clear, and in the case of a new wine, this can be bottled without any risk of the subsequent formation of deposits or cloudiness.

An important application of the process consists in producing this emulsion by the use of air upon the musts at the commencement and during the course of the fermentation. Thus the action of the oxygen will produce, in addition to the aforesaid rendering of the substances insoluble, a perfect aeration of the musts,

[*Price* 1/-]

an acceleration and an amelioration of the fermentation, which will thus be entirely performed without leaving for the germs other than the yeasts the time to develop. When employed at the end of difficult fermentations, it will stimulate the paralysed yeasts and will permit the elimination of the last traces of sugar, and the obtainment of an amount of alcohol which could not be hitherto realized for the season of the natural fermentations usually precedes the cold season which prevents the development of the yeasts. On the other hand, the elimination of the last traces of sugar will avoid all risk of the secondary fermentation of the product at the next spring. The same treatment will also facilitate the starting of an acetic fermentation and will further the action of the ferments.

At the end of the actual fermentation, the air emulsion eliminates the carbonic acid gas whose slow upward movement prevents the natural clarification (cleansing) and acts against the clarification by fining. This will greatly reduce the time of contact of the wine with the lees and the first drawing-off can be rapidly effected by eliminating, by fractionation, all the germs of substances subject to alteration.

The air emulsion can also be obtained to advantage after the addition of tannin, and it will greatly further the action of this product, by permitting to obtain in a few hours, an effect which requires several days with the known processes.

On the other hand, after defective fermentations or secondary fermentations, or in the case of products having bad odours contracted by contact with unclean recipients, such as tank wagons, the air emulsion will provide for the elimination of all such prejudicial factors.

Endwise, it is a known fact that wines, at the commencement of their existence (and chiefly during the first year), as well as beer or the like require to be aerated. This aeration can be well obtained by a slight formation of the said emulsion by the use of air, but this air is preferably, according to my invention, preliminary filtered by means of an air purifying apparatus of any type. The cooling can thus be well replaced by the streaming of the beer musts. The same treatment can be utilized in order to develop the bouquet of alcoholic products.

The process according to the invention is not restricted to the use of atmospheric air, but it can employ various gases.

An interesting application of the invention consists in the use of carbonic acid gas. This addition will be particularly valuable for the treatment of old wines or others which are kept out of contact with air in order to protect the surface of vats consisting of cement, glass, enamelled sheet metal or the like against the production of organic surface formations, and for the treatment of cider, in which case it will also afford a slight sparkling effect.

Another application of the invention consists in the addition of sulphurous anhydride to the juice. This operation is chiefly performed with fresh grape juice leaving the press, in order to prevent its fermentation. The systematic mixture, perfectly effected, of the gas and the juice will provide " muted products " which will keep for a long time.

The processes in conformity to the invention and their applications can be carried into effect in many different ways, but according to a preferred method, the juice is emulsified outside of the vat, in a special apparatus which communicates with the atmosphere or with a suitable gas supply and the juice circulates through the said apparatus by gravity or by means of a pump.

For all such treatments, I preferably utilize the simple and effective apparatus which will be described in the following description and which forms part of my invention.

This apparatus consists of a trompe and the suction conduit of this trompe may communicate with the atmosphere or may be connected with a tank or a source of emulsifying gas (a CO^2 gas producer, a compressed gas cylinder or the like); the juice under treatment forms the liquid circulating in the trompe under the action of a pump or similar apparatus

It is understood that the juice to be treated which passes through the trompe will continuously suck the gas, which forms an intimate mixture with the juice in the shape of small bubbles, thus emulsifying the juice. The said juice may be circulated for instance by gravity, or by means of a pump supplying the juice from the vat to the apparatus, or by two pumps whereof one withdraws the liquid and delivers it to the apparatus and the other evacuates, into a vat or the like, the liquid which has passed through the apparatus.

According to a preferred form of construction, the said apparatus consists of two coaxial conduits whose internal form is cylindrical and which terminate in the form of truncated cones whose parallel end sections are opposite each other and have a small diameter, said conduits being contained in a closed chamber having an orifice for the suction of gas.

In order to facilitate the starting of the trompe, the one of the truncated cone

which serves for the discharge of the liquid has preferably in its interior a conical surface which is parallel with it and whose position is preferably adjustable in its interior. The truncated cones are preferably interchangeable, in order to permit to adapt their section to the output of the liquid and to the pressure employed.

Further characteristics and advantages of my invention will be set forth in the following description with reference to the accompanying drawings which are given solely by way of example and upon which:

Fig. 1 is a cross section of the apparatus in conformity of my invention.

Figs. 2 and 3 are respectively an elevational view and a plan view of a detail.

Fig. 4 shows a method of mounting of the apparatus.

In the form of construction herein represented, the apparatus consists of two tubes 1 and 2 terminated by coaxial truncated conical extension pieces 3 and 4, whose outlet orifices 5 and 6 are opposite each other. The tube 2 is pierced at a point adjacent the base of the cone 4 with one or more apertures 9. It contains in its interior a supplementary cone 10, which is parallel with the cone 4 and to whose base are secured the wings 11 (Figs. 2 and 3) by which it is centered in the tube 2. The wings 11 have in their end edges notches 12 which serve as a seating for a ring 13 whose outer edge is held by a groove formed on the inner surface of the tube 2 and adapted to regulate the position of the cone 10 in this tube. This regulating may however be simply effected by the contact between a ring such as 13 and an internal projection on the tube 2, for instance at the point of junction of the tube 2 with its extension piece 4.

The tubes 1 and 2 are maintained by threaded cylindrical supports 7 and 8, which permit to regulate the distance between the outlet orifices 5 and 6, and which are itself mounted in a casing 15 preferably of a cylindrical shape.

The casing 15 is pierced with an orifice 16 which is closed by a ball 17 and upon which is screwed a safety cap 18, permitting the ball to be lifted by an excess of pressure. An orifice 19 in the casing is adapted for a connection with the atmosphere or by means of a tube with a tank or like source of gas supply (cylinder of compressed gas, etc.).

It will be understood that the wine or other juice sent into the conduit 1 will pass through the apparatus which will be at once excited by means of the cone 10. The gas is thus drawn in through the orifice 19 and is intimately mingled with the juice or other, which then leaves the apparatus along with the gas. Any liquid which may accumulate in the casing is drawn through the apertures 9.

The apparatus may be mounted for example between two filled vats having different levels, and in this case no pump will be necessary, or otherwise a pump may be mounted in order to circulate the juice from one tank to the apparatus, whence it will flow by gravity into another tank, or again, to cooperate with two pumps whereof one withdraws the juice and delivers it to the apparatus and the other evacuates the juice leaving the apparatus into a recipient placed at any suitable level.

In the form of construction represented in Fig. 4, the apparatus is combined with two centrifugal pumps mounted in tandem, one on the upstream side and the other on the downstream side of the apparatus. The two pumps are driven directly by the same electric motor 20, thus forming a group which may be utilized in any given conditions. Fig. 4 also shows the pipe used to supply the gas which will at once emulsify, in a simple manner, the juice traversing the apparatus.

Obviously, my invention is not limited to the forms of construction herein described and represented, which are given solely by way of example.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A process for the treatment of the juices of fruits (wine, beer, cider, musts), of alcoholic products or the like, which consists in emulsifying such juice by means of a gas and then allowing it to stand in a vat or the like.

2. A process for the treatment of the juices of fruits as claimed in claim 1 in which the gas utilized is oxygen, preferably in the form of air.

3. A process for the treatment of the juices of fruits as claimed in claim 2 wherein the said emulsion is formed at the beginning of and during the alcoholic fermentation, and preferably also after the fermentation.

4. A process for the treatment of the juices of fruits as claimed in claim 2 wherein the emulsion is formed at the beginning of and during the acetic fermentation.

5. A process for the treatment of the juices of fruits as claimed in claim 2 wherein the emulsion is formed with new

wine by means of, preferably, cold or cooled air.

6. A process for the treatment of the juices of fruits as claimed in claim 2 wherein the emulsion is formed after the addition to said juices of tannin.

7. A process for the treatment of the juices of fruits as claimed in claim 2 wherein the juice is "fined" after the emulsifying air has been added.

8. A process for the treatment of the juices of fruits as claimed in claim 2 wherein the emulsion is formed with fermented products having bad odours.

9. A process for the treatment of the juices of fruits as claimed in claim 2 wherein the air is purified before it is used in the treatment.

10. A process for the treatment of the juices of fruits as claimed in claim 1 in which the emulsion is formed by means of CO^2, advantageously with old wines or with ciders.

11. A process for the treatment of the juices of fruits as claimed in claim 1 in which the emulsion is formed by means of SO^2, advantageously with grape juice as soon as it leaves the press.

12. A process for the treament of the juices of fruits as claimed in any of the preceding claims in which the emulsion is formed in an apparatus located outside of the vat containing the product to be treated and in which the said product is circulated by means of a pump or the like or by gravity.

13. A process for the treatment of the juices of fruits as claimed in claim 12 in which the product is circulated from one vat or the like to the emulsifying apparatus whence it is evacuated in another vat or the like where it is allowed to stand.

14. An apparatus for the execution of the process as claimed in claim 12 communicating with the atmosphere by means of a filter, or connected with a source of gas (cylinder, gas producer, etc.), and consisting of a trompe whose suction conduit communicated with said source whilst the juice to be treated constitutes the liquid iself which circulates in said device by the action of a pump or the like.

15. An apparatus as claimed in claim 14 which consists of two coaxial conduits, which are circular in their interior, and terminate in the form of truncated cones whose parallel end sections are adjacent each other and have a small diameter, said conduits being contained in a casing provided with an orifice for gas suction.

16. An apparatus as claimed in claim 14 wherein the truncated cone of the said pair, which serves for the discharge of the liquid, preferably comprises in its interior a conical surface which is parallel to this cone and whose position is preferably adjustable.

17. An apparatus as claimed in claim 15 wherein the truncated cones are interchangeable.

18. An apparatus as claimed in claim 15 comprising further a safety device adapted to place the casing of the apparatus in communication with the atmosphere in case of excessive pressure.

19. A process for the treatment of the juices of fruits substantially as described.

20. An apparatus for the treatment of the juice of fruits substantially as described and as shown in the appended drawings.

Dated the 3rd day of October, 1935.

(Sgd.) R. M. NEILSON,
98, West George Street,
Glasgow, C.2,
Chartered Patent Agents.

Leamington Spa: Printed for His Majesty's Stationery Office, by the Courier Press.—1937.

Fig. 1

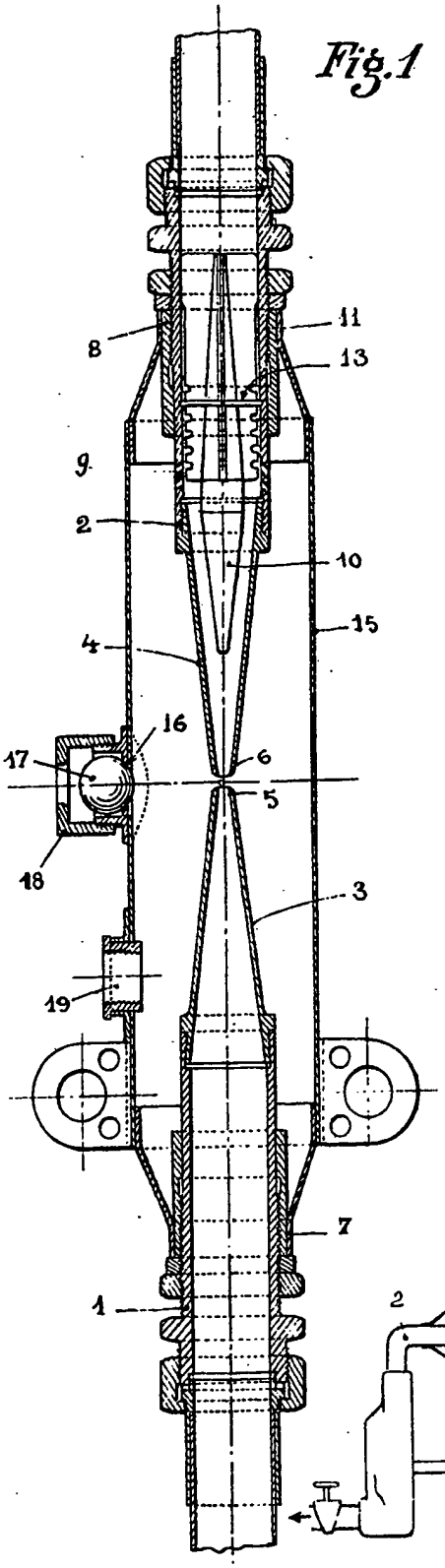


Fig. 2

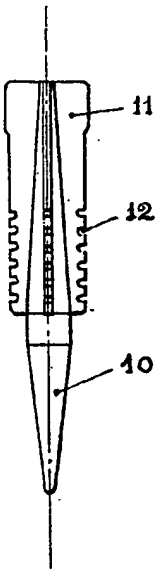


Fig. 3

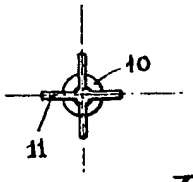
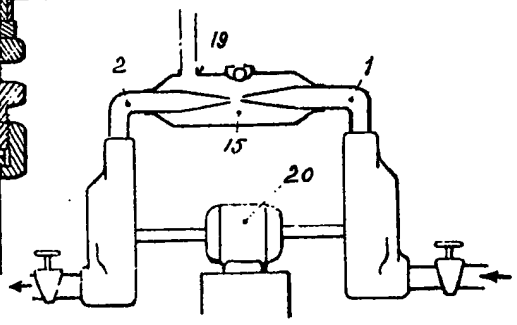


Fig. 4



Malby & Sons, Photo-Litho